

CLAIMS

1. A method for estimating a transmission channel in a digital communications system which operates in accordance with GSM specifications, said communications system including a receiver which receives a signal transmitted over the transmission channel, said receiver including a channel estimation-based equalizer, said equalizer having a window size adapted to the actual delay spread of the transmission channel, and said equalizer using an estimate of the transmission channel for synchronizing and correcting said received signal, said received signal including a 26-symbol training sequence, said method comprising:

using any consecutive 16-symbol segment of said 26-symbol training sequence to estimate, without matrix operation, the transmission channel for different equalizer window sizes at different synchronization points.

2. The method according to Claim 1, where tap values for different synchronization points and tap positions are obtained in a two-dimensional recursive computation step for joint optimization of synchronization and window sizing of the said equalizer using Least Square Error (LSE) criterion.

3. The method according to Claims 1 or 2, wherein said digital communications system operates in accordance with GSM/EDGE specifications.

4. The method according to Claims 1 or 2, wherein said different equalizer window sizes comprises equalizer window spans of from 1-8 taps.

5. The method according to Claims 1 or 2, wherein said using step comprises using delayed (shifted) segments in the training sequence for said estimation.

6. The method according to Claim 2, wherein said tap values for different synch
5 points are calculated in the 2-dimensional "north-west" direction.

7. The method according to Claims 1 or 2, wherein the consecutive 16-symbol
segment used is close to the end of the 26-symbol training sequence.

10 8. The method according to Claim 5, wherein the consecutive 16-symbol segment
used is the last but one $m + 15$ symbols, where m is the equalizer window size.

9. The method according to Claim 1, wherein said using step comprises using an
Least Square Error (LSE) approach for said estimation.

15 10. The method according to Claim 2, wherein said using step comprises using an
LSE approach for joint synchronization and equalizer window sizing.

11. A method for estimating a transmission channel in a digital communications
20 system which operates in accordance with GSM/EDGE specifications, said communications
system including a receiver which receives a signal transmitted over the transmission channel,
said receiver including a channel estimation-based equalizer which uses an estimate of the

transmission channel for correcting said received signal, said signal including a 26-symbol training sequence, said method comprising:

using any consecutive 16-symbol segment of said 26-symbol training sequence to estimate, without matrix operation, the transmission channel for different equalizer window sizes of from 1 to 8 symbols long.

12. The method according to Claim 11, wherein said using step comprises using delayed (shifted) segments of the training sequence for said estimation.

13. The method according to Claim 12, wherein said using step comprises using a Least Square Error (LSE) approach for channel estimation.

14. An apparatus for estimating a transmission channel in a digital communications system which operates in accordance with GSM/EDGE specifications, said system including a receiver which receives a signal transmitted over the transmission channel, said receiver including a channel estimation-based equalizer which uses an estimate of the transmission channel for correcting said received signal, said received signal including a 26-symbol training sequence, said equalizer using any consecutive 16-symbol segment of said 26-symbol training sequence for estimating, without matrix operation, the transmission channel for different equalizer window sizes of from 1 to 8 symbols long.

15. An apparatus for equalization of transmission channel in a digital communications system which operates in accordance with GSM/EDGE specifications, said apparatus including a

receiver which receives a signal transmitted over the transmission channel, said receiver including a channel estimation-based equalizer which uses joint synchronization and equalizer window sizing to optimize the equalizer operation.

FOR SEPARATE